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GENETIC EFFECTS OF MICROWAVE EXPOSURE ON MAMMALIAN
CELLS IN VITRO VOLUME 2. (U) TEXAS A&M HEALTH SCIENCE
CENTER AT SAN ANTONIO DEPT OF RADIO. M L MELTZ ET AL.
OCT 84 USAFSAM-TR-84-24-APP-A F/G 6/18

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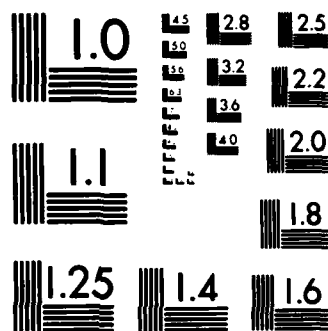
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

AD-A148 866

Report USAFSAM-TR-84-24-APP-A

APPENDIX A: CYTOGENETICS AND GROWTH KINETICS DATA, 850 MHz

For USAFSAM-TR-84-24:

GENETIC EFFECTS OF MICROWAVE EXPOSURE ON MAMMALIAN CELLS IN VITRO: VOLUME II

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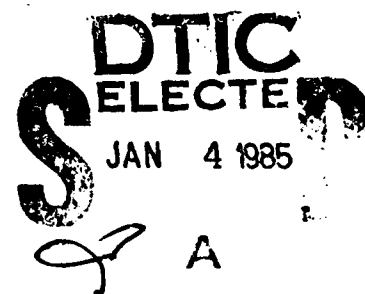
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6c. ADDRESS (City, State and ZIP Code) Division of Radiation Oncology 7703 Floyd Curl Drive San Antonio, Texas 78284			7b. ADDRESS (City, State and ZIP Code) Aerospace Medical Division (AFSC) Brooks Air Force Base, Texas 78235-5000		
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11. TITLE (Include Security Classification) GENETIC EFFECTS OF MICROWAVE EXPOSURE ON MAMMALIAN CELLS IN VITRO: VOLUME II (APPENDIX A: CYTOGENETICS AND GROWTH KINETICS DATA, 850 MHz)					
12. PERSONAL AUTHOR(S) Meltz, Martin L.; Harris, Clifton R.; and Walker, Kathleen A.					
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17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB. GR.	Cell growth; cell viability; Chinese Hamster Ovary; chromo-		
06	18		some aberrations; DNA repair; human fibroblasts; radiofrequency		
			radiation; RFR; and sister chromatid exchange		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This work is a continuation of studies designed to answer the question of whether radiofrequency radiation (RFR) at lower power levels (no greater than 10 mW/cm ²), where measurable heating in the exposure system cannot be detected, causes any transient or permanent alteration in a series of subtle biochemical processes elicited in the DNA of mammalian cells. The specific process(es) being studied are: the effects of RFR on repair synthesis in normal human fibroblasts after ultraviolet light damage of the DNA; and the possible induction by RFR of sister chromatid exchanges or chromosome aberrations in Chinese Hamster Ovary cells. Additional information obtained in the latter studies includes any effects on cell viability (by cloning efficiency) or on cell growth (increase in cell number).					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS <input type="checkbox"/>			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		

EXPERIMENT NUMBER 1



A-1

EDITOR'S NOTE: Divider pages, for the respective experiments, are not numbered in these Appendixes.

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

EXPERIMENT NUMBER: 1

FLASK NUMBER:

SLIDE NUMBER: 1

"CONTROL 1"

GROUP#: 4876
CHROMOSOME #

19	19	21	20	21
17	20	21	19	22
20	18	17	21	22
18	18	18	20	19
20	17	20	22	19
22	23	16	16	20
20	20	22	20	21
21	20	22	19	18
18	21	20	18	20
18	21	21	18	19

SUM982
SUMSQ19424
MEAN19.64
SD1.67527
GROUP#: 4876
SCE/CELL

13	10	10	14	14
10	10	11	12	14
9	12	11	12	9
10	9	13	9	12
12	11	12	8	9
10	12	11	10	8
13	10	9	10	12
10	11	11	10	10
12	11	12	9	7
11	10	11	11	10

SUM537
SUMSQ5889
MEAN10.74
SD1.57545

SLIDE NUMBER: 2

GROUP#: 4049
CHROMOSOME #

18	19	20	20	20
20	21	22	18	18
18	20	21	19	19
16	18	20	20	20
18	20	18	21	19
20	21	20	20	21
19	19	17	19	20
20	20	20	18	19
19	20	21	19	18
19	20	20	18	19

SUM969
SUMSQ18847
MEAN19.38
SD1.17612
GROUP#: 4049
SCE/CELL

11	11	9	10	9
11	11	10	10	9
11	11	10	10	10
11	9	10	10	11
12	11	11	12	11
11	10	11	11	11
11	9	13	11	11
9	10	11	9	11
10	10	12	11	10
11	11	10	12	12

SUM529
SUMSQ5639
MEAN10.58
SD.927802

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 1

SLIDE NUMBER: 1

TEMPERATURE: 37°C

FLASK NUMBER:

CONTROL 2

GROUP#: 3945
CHROMOSOME #

19	20	21	19	19
20	19	19	19	19
20	19	19	20	19
20	20	20	19	19
20	19	19	20	19
20	19	19	20	19
20	19	20	20	20
19	19	20	19	19
20	20	20	20	20
20	17	19	20	20

SUM974
SUMSQR18994
MEAN19.48
SD.646498
GROUP#: 3945
SCE/CELL

9	10	10	12	10
10	11	11	11	11
11	9	10	10	11
11	11	11	10	10
11	11	11	10	11
11	9	9	12	10
10	11	10	10	10
10	11	10	10	11
11	11	10	11	10
12	11	11	10	11

SUM525
SUMSQR5539
MEAN10.5
SD.735402

SLIDE NUMBER: 2

GROUP#: 3897
CHROMOSOME #

19	20	20	20	21
20	20	17	17	19
20	21	20	20	22
20	18	17	19	18
20	19	20	23	19
21	19	20	16	19
17	21	18	20	19
17	18	19	19	19
21	21	20	18	18
19	19	18	19	17

SUM961
SUMSQR18571
MEAN19.22
SD1.43271
GROUP#: 3897
SCE/CELL

12	12	10	9	11
11	8	12	10	11
10	9	11	11	11
8	8	11	10	11
9	8	12	11	11
10	12	11	10	9
9	11	8	9	11
12	10	12	11	10
11	16	11	10	12
9	10	12	9	11

SUM523
SUMSQR5577
MEAN10.46
SD1.47372

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

EXPERIMENT NUMBER: 1

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 1

GROUP#: 7630
CHROMOSOME #

19	19	22	14	16
18	15	18	20	14
23	21	19	21	19
17	22	21	17	19
17	16	21	22	22
17	15	19	18	24
23	22	23	18	21
19	18	20	20	18
19	19	19	19	23
22	18	21	19	22

SUM968
SUMSQ19036
MEAN19.36
SD2.45581

GROUP#: 7630
SCE/CELL

8	9	12	10	9
12	7	10	13	9
12	15	9	9	9
11	9	6	10	8
12	14	6	10	13
10	8	10	11	13
9	6	8	7	12
11	13	13	10	5
8	5	14	12	14
9	12	10	8	9

SUM499
SUMSQ5279
MEAN9.98
SD2.47015

SLIDE NUMBER: 2

GROUP#: 4274
CHROMOSOME #

19	18	20	18	22
19	20	19	21	21
21	17	22	21	21
19	19	19	18	18
19	20	20	20	22
20	20	20	21	18
22	22	20	20	18
21	20	22	20	24
19	19	18	19	19
17	19	18	20	20

SUM989
SUMSQ19669
MEAN19.78
SD1.47482

GROUP#: 4274
SCE/CELL

9	8	10	10	12
10	10	11	11	9
13	9	8	10	11
11	10	10	9	10
9	11	12	12	10
11	9	10	10	12
10	12	10	11	13
6	10	8	9	10
12	11	10	12	9
12	9	10	11	13

SUM515
SUMSQ5405
MEAN10.3
SD1.43214

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 1

SLIDE NUMBER: 1

TEMPERATURE: 39°C

FLASK NUMBER:

EXPOSED 2

GROUP#: 3419

CHROMOSOME #

20	20	20	20	20
20	20	19	20	21
20	21	19	20	19
19	20	19	20	19
19	19	20	18	18
19	20	19	19	20
19	19	20	19	20
19	19	19	19	19
19	20	20	19	19
20	20	19	18	20

SUM973

SUMSQR18957

MEAN19.46

SD.676425

GROUP#: 3419

SCE/CELL

10	10	11	11	11
10	11	11	11	10
10	9	11	11	11
11	9	10	10	10
10	12	10	11	10
11	10	11	11	10
11	11	11	10	10
11	9	11	10	10
12	11	12	12	11
10	11	10	11	11

SUM529

SUMSQR5623

MEAN10.58

SD.730949

SLIDE NUMBER: 2

GROUP#: 5327

CHROMOSOME #

17	18	18	20	20
18	19	19	18	17
21	18	20	19	22
18	20	20	18	19
23	16	20	19	21
18	20	20	20	20
19	22	20	20	22
22	17	16	20	17
21	18	20	19	19
19	19	22	19	19

SUM966

SUMSQR18788

MEAN19.32

SD1.59642

GROUP#: 5327

SCE/CELL

12	11	12	10	11
11	12	9	6	13
11	11	12	10	10
13	12	9	10	8
11	11	10	13	12
12	13	7	9	10
11	10	12	9	11
9	8	13	12	10
10	8	11	14	13
13	7	10	9	10

SUM531

SUMSQR5797

MEAN10.62

SD1.79444

FREQUENCY:
850 MHz

TEMPERATURE (deg C):
37

EXPERIMENT #:
1

GROUP	# CELLS SCORED	DICENTRICS/CELL
CONTROL	500	0
EXPOSED	500	0

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

PARAMETER: Growth Kinetics

EXPERIMENT NUMBER: 1

Time (hr.)	Cells/Flask		Mean Cells/Flask (1 SD)	
	<u>CONTROL</u>	<u>EXPOSED</u>	<u>CONTROL</u>	<u>EXPOSED</u>
2	11421	11526	11428 (21)	11557 (30)
	11456	11547		
	11406	11597		
24	44782	45204	45791 (14)	45172 (24)
	45811	45168		
	45780	45145		
48	207767	200007	207786 (14)	200026 (22)
	207792	200014		
	207799	200056		

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

PARAMETER: Cell Survival

EXPERIMENT NUMBER: 1

COLONIES/FLASK		SURVIVING FRACTION
Control	Exposed	
187	192	1.03
184	186	1.00
<u>185</u>	192	<u>1.03</u>
Mean 186		Mean (1 SD) 1.02 (0.014)

EXPERIMENT NUMBER 2

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 2

SLIDE NUMBER: 1

TEMPERATURE: 37°C

FLASK NUMBER:

CONTROL 1

GROUP#: 898
CHROMOSOME #

19	23	16	20	21
19	22	18	16	17
18	19	19	20	19
18	21	20	18	22
20	19	21	21	19
19	19	22	19	22
21	19	19	20	20
19	22	19	21	22
20	19	19	20	21
20	20	20	19	19

SUM985
SUMSQR19515
MEAN19.7
SD1.5017
GROUP#: 898
SCE/CELL

11	10	9	10	10
10	10	13	10	8
12	9	9	12	9
13	9	10	10	13
10	12	9	10	12
9	9	13	11	10
11	10	13	11	9
9	15	12	9	9
10	11	11	11	11
9	9	10	12	10

SUM524
SUMSQR5600
MEAN10.48
SD1.48791

SLIDE NUMBER: 2

GROUP#: 7066
CHROMOSOME #

20	20	19	19	19
19	20	20	20	19
20	19	20	20	20
20	20	20	19	19
19	20	20	20	20
18	18	19	19	20
20	18	21	20	20
20	19	18	19	20
19	20	18	19	19
19	19	19	19	19

SUM970
SUMSQR18842
MEAN19.4
SD.699854
GROUP#: 7066
SCE/CELL

11	10	10	11	11
11	10	10	11	11
10	11	10	12	11
10	11	10	10	11
10	12	12	11	11
10	11	11	11	11
11	12	11	11	9
9	10	10	11	11
9	11	10	10	11
10	12	11	10	12

SUM533
SUMSQR5711
MEAN10.66
SD.772222

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 2

SLIDE NUMBER: 1

TEMPERATURE: 39°C

FLASK NUMBER:

EXPOSED 1

GROUP#: 5876
CHROMOSOME #

19	19	19	21	20
19	20	18	19	20
20	20	19	19	19
19	19	20	20	19
19	19	19	20	19
20	19	20	19	19
20	18	20	19	19
20	19	19	20	20
19	19	20	19	20
18	19	19	19	20

SUM967
SUMSQR18721
MEAN19.34
SD.626295
GROUP#: 5876
SCE/CELL

10	11	9	12	10
11	10	10	10	12
11	11	11	11	11
11	11	10	11	10
11	11	10	11	10
9	9	11	10	10
11	10	10	10	11
10	10	10	10	10
11	10	11	10	11
11	10	11	11	10

SUM523
SUMSQR5493
MEAN10.46
SD.676425

SLIDE NUMBER: 2

GROUP#: 9447
CHROMOSOME #

20	20	19	18	20
20	19	20	20	19
20	21	19	18	20
20	19	18	19	19
19	19	20	20	20
21	19	21	19	20
20	19	21	19	19
18	19	19	20	19
19	21	20	19	20
19	19	20	20	20

SUM976
SUMSQR19082
MEAN19.52
SD.788696
GROUP#: 9447
SCE/CELL

10	10	10	12	9
10	11	10	10	10
10	10	10	11	10
12	11	10	11	11
12	11	10	10	10
12	10	10	11	10
10	11	12	12	11
11	10	11	11	11
11	11	10	11	11
9	11	11	10	10

SUM529
SUMSQR5625
MEAN10.58
SD.758355

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

EXPERIMENT NUMBER: 2

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 2

GROUP#: 7698
CHROMOSOME #

19	20	16	19	20
20	20	20	20	18
21	20	20	20	20
18	21	18	20	19
21	21	22	19	20
19	20	19	20	19
18	18	20	20	17
19	22	18	21	19
20	21	19	18	18
19	20	21	18	19

SUM974

SUMSDR19048

MEAN19.48

SD1.23288

GROUP#: 7698

SCE/CELL

11	9	12	11	9
11	12	11	10	10
10	8	11	12	10
11	9	11	11	11
11	9	9	10	11
10	11	10	12	11
12	12	8	11	12
13	13	11	10	11
10	11	10	12	12
12	10	10	13	9

SUM536

SUMSDR5818

MEAN10.72

SD1.21286

SLIDE NUMBER: 2

GROUP#: 2422
CHROMOSOME #

18	20	20	20	18
21	17	19	19	18
18	19	18	17	22
20	18	19	20	20
20	20	17	18	20
19	20	18	20	18
19	21	18	20	22
19	18	19	19	19
20	21	18	20	21
21	19	19	17	19

SUM960

SUMSDR18510

MEAN19.2

SD1.26168

GROUP#: 2422

SCE/CELL

10	10	10	11	9
9	9	10	12	13
10	11	10	11	12
9	10	12	9	9
11	10	10	8	12
10	9	12	11	10
12	13	10	10	10
9	9	10	11	11
9	13	11	11	13
10	11	8	11	11

SUM522

SUMSDR5530

MEAN10.44

SD1.28031

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

PARAMETER: Cell Survival

EXPERIMENT NUMBER: 2

COLONIES/FLASK		SURVIVING FRACTION
Control	Exposed	
182	164	0.94
178	178	1.02
<u>162</u>	176	<u>1.01</u>
Mean 174		Mean (1 SD) 0.99 (0.036)

EXPERIMENT NUMBER 3

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 3

SLIDE NUMBER: 1

TEMPERATURE: 37°C

FLASK NUMBER:

CONTROL 1

GROUP#: 8860
CHROMOSOME #

19	20	20	21	21
21	21	19	21	18
19	21	19	19	19
19	20	20	19	19
20	19	20	19	20
21	19	20	17	18
18	20	19	20	19
19	18	21	19	20
19	20	18	19	21
19	19	19	18	21

SUM974
SUMSQ19024
MEAN19.48
SD1.01499
GROUP#: 8860
SCE/CELL

11	10	10	11	12
8	12	10	12	10
9	11	10	10	11
13	11	10	11	11
9	11	11	10	10
9	8	10	10	9
10	11	10	11	11
10	9	11	11	9
11	10	10	10	9
11	9	10	9	10

SUM512
SUMSQ5294
MEAN10.24
SD1.0214

SLIDE NUMBER: 2

GROUP#: 3523
CHROMOSOME #

20	20	19	19	20
20	17	18	19	19
20	20	20	19	22
19	19	18	21	18
20	20	19	19	19
20	20	19	20	18
21	20	21	20	19
21	20	20	17	19
18	20	18	17	19
21	21	20	20	21

SUM974
SUMSQ19036
MEAN19.48
SD1.1292
GROUP#: 3523
SCE/CELL

10	10	10	10	12
9	10	11	10	10
9	9	9	10	10
12	10	11	12	12
12	10	11	10	11
11	9	9	11	12
11	11	10	11	10
11	10	11	11	11
11	13	11	11	11
11	10	11	11	12

SUM531
SUMSQ5683
MEAN10.62
SD.945235

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

EXPERIMENT NUMBER: 3

FLASK NUMBER:

SLIDE NUMBER: 1

CONTROL 2

GROUP#: 1978
CHROMOSOME #

21	15	18	19	17
23	17	20	18	21
21	20	17	22	20
23	20	18	16	17
20	20	17	17	19
20	18	22	17	20
19	18	21	20	21
16	18	21	18	19
24	21	19	18	16
21	22	21	16	21

SUM963
SUMSQR18765
MEAN19.26
SD2.10742

GROUP#: 1978
SCE/CELL

12	11	10	14	11
12	16	11	14	8
7	7	12	11	12
10	8	11	10	12
6	8	14	13	14
11	10	7	10	11
14	15	8	10	8
13	12	9	12	10
11	13	10	10	10
15	10	9	13	12

SUM547
SUMSQR6247
MEAN10.94
SD2.31596

SLIDE NUMBER: 2

GROUP#: 114
CHROMOSOME #

19	19	21	20	18
19	19	19	19	19
18	21	20	19	20
19	19	19	19	19
20	19	19	19	19
19	19	19	21	20
19	21	19	20	21
21	19	19	21	19
19	21	20	20	19
20	20	19	18	19

SUM973
SUMSQR18969
MEAN19.46
SD.838122

GROUP#: 114
SCE/CELL

9	11	11	10	9
11	12	10	10	11
10	10	11	10	11
11	11	11	10	10
11	11	11	10	10
10	10	10	10	10
11	10	8	10	10
11	11	11	12	10
11	10	9	10	11
11	11	10	11	11

SUM521
SUMSQR5457
MEAN10.42
SD.758355

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

EXPERIMENT NUMBER: 3

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 1

GROUP#: 7007
CHROMOSOME #

20	21	19	19	20
20	19	19	20	20
19	19	19	20	19
20	19	19	19	19
20	20	20	19	20
19	19	19	19	20
18	20	20	19	20
19	20	19	20	18
19	20	19	20	19
20	20	21	19	19

SUM973
SUMSQR18955
MEAN19.46
SD.64555
GROUP#: 7007
SCE/CELL

11	11	11	11	11
11	10	12	11	10
12	11	10	11	11
10	11	10	9	10
11	10	11	11	10
10	10	10	10	10
11	10	10	10	9
11	10	10	11	10
10	10	10	10	10
10	11	10	11	10

SUM521
SUMSQR5449
MEAN10.42
SD.641745

SLIDE NUMBER: 2

GROUP#: 2651
CHROMOSOME #

18	19	20	19	19
18	19	21	21	22
20	18	17	18	20
18	19	18	20	20
18	21	19	17	23
20	18	19	22	20
21	20	20	18	20
21	20	17	17	21
20	21	21	17	20
19	20	19	19	18

SUM970
SUMSQR18920
MEAN19.4
SD1.44279
GROUP#: 2651
SCE/CELL

11	10	12	9	9
11	11	10	11	11
10	10	11	12	11
10	11	9	9	10
7	9	9	8	10
10	10	12	10	11
10	11	8	10	9
11	8	12	9	10
9	13	11	8	11
8	10	11	9	9

SUM501
SUMSQR5099
MEAN10.02
SD1.26958

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

EXPERIMENT NUMBER: 3

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 2

GROUP#: 3502

CHROMOSOME #

20	20	20	19	20
20	19	20	20	20
19	20	18	20	21
19	20	20	20	20
21	18	18	20	20
20	19	20	20	18
19	18	20	19	20
20	18	20	19	20
19	19	20	19	20
19	19	19	20	19

SUM975

SUMSQ19041

MEAN19.5

SD.762648

GROUP#: 3502

SCE/CELL

9	10	9	11	11
10	10	11	11	11
9	9	11	9	11
10	11	10	11	10
10	10	11	11	10
10	11	11	9	11
10	11	11	10	10
10	11	10	9	11
11	11	11	11	10
12	10	11	11	10

SUM519

SUMSQ5415

MEAN10.38

SD.752953

SLIDE NUMBER: 2

GROUP#: 6487

CHROMOSOME #

18	20	19	21	20
19	18	19	20	19
20	19	20	20	20
20	18	20	19	21
19	20	19	22	18
19	20	19	18	19
20	18	20	20	21
20	19	19	19	20
18	20	20	20	19
20	18	20	19	20

SUM973

SUMSQ18975

MEAN19.46

SD.908239

GROUP#: 6487

SCE/CELL

10	11	10	10	10
10	10	11	10	11
8	11	11	10	9
10	12	12	9	11
11	11	10	10	11
10	9	11	10	9
11	10	11	10	9
9	10	11	11	12
10	11	11	10	10
11	12	10	11	11

SUM519

SUMSQ5425

MEAN10.38

SD.878078

FREQUENCY:
850 MHz

TEMPERATURE (deg C):
37

EXPERIMENT #:
3

GROUP	# CELLS SCORED	DICENTRICS/CELL
CONTROL	500	0
EXPOSED	500	0

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

PARAMETER: Cell Survival

EXPERIMENT NUMBER: 3

COLONIES/FLASK		SURVIVING FRACTION
Control	Exposed	
148	164	1.07
160	152	.99
<u>151</u>	148	<u>.97</u>
Mean 153		Mean (1 SD) 1.01 (0.043)

EXPERIMENT NUMBER 4

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

EXPERIMENT NUMBER: 4

FLASK NUMBER:

SLIDE NUMBER: 1

CONTROL 1

GROUP#: 9554

CHROMOSOME #

19	19	20	18	18
20	18	21	21	18
21	19	20	19	16
20	20	22	19	19
20	20	19	16	20
18	18	20	18	20
18	18	18	21	19
22	20	18	21	16
19	19	19	19	20
21	21	19	19	18

SUM961

SUMSQR18565

MEAN19.22

SD1.38932

GROUP#: 9554

SCE/CELL

11	9	9	11	10
10	9	12	10	10
10	9	9	11	11
11	9	11	14	12
10	10	8	10	11
11	10	10	10	10
16	13	10	12	11
12	9	9	9	11
10	9	10	11	10
10	9	10	8	10

SUM517

SUMSQR5447

MEAN10.34

SD1.43726

SLIDE NUMBER: 2

GROUP#: 6968

CHROMOSOME #

18	19	21	20	18
20	20	19	20	20
19	20	18	20	21
19	20	20	19	20
19	19	20	19	18
19	19	18	22	19
20	21	19	21	20
20	19	19	19	19
19	21	19	19	19
20	20	20	20	19

SUM976

SUMSQR19090

MEAN19.52

SD.886175

GROUP#: 6968

SCE/CELL

11	11	11	11	9
11	10	10	10	10
10	10	11	8	12
10	10	10	11	11
11	10	10	10	10
11	11	10	9	10
11	11	10	11	11
11	10	11	11	10
12	10	11	10	10
11	10	12	10	10

SUM522

SUMSQR5478

MEAN10.44

SD.760236

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 4

SLIDE NUMBER: 1

TEMPERATURE: 37°C

FLASK NUMBER:

CONTROL 2

GROUP#: 7726
CHROMOSOME #

18	18	19	20	21
21	20	17	21	18
21	20	22	19	17
17	18	20	20	19
20	19	19	20	19
20	20	20	18	21
18	19	19	19	18
20	17	19	18	21
18	20	18	20	19
20	19	20	20	21

SUM965
SUMSQR18699
MEAN19.3
SD1.23305

GROUP#: 7726
SCE/CELL

10	10	9	11	9
10	10	12	10	9
11	10	8	14	9
12	13	9	11	11
11	12	12	8	9
9	13	13	12	11
9	10	9	9	11
13	9	9	9	9
11	13	10	10	13
11	10	10	10	10

SUM523
SUMSQR5581
MEAN10.46
SD1.50116

SLIDE NUMBER: 2

GROUP#: 8853
CHROMOSOME #

21	19	18	18	20
19	20	19	20	21
19	21	19	19	20
20	20	20	20	20
20	21	19	19	20
20	21	20	20	21
21	19	19	19	19
20	19	20	19	20
20	20	20	20	19
19	19	20	19	19

SUM984
SUMSQR19394
MEAN19.68
SD.767716

GROUP#: 8853
SCE/CELL

11	10	11	11	9
12	11	10	10	10
10	11	11	11	11
11	10	12	11	11
11	12	9	10	10
10	11	11	11	11
10	10	10	11	11
10	11	10	10	9
9	10	11	11	10
11	11	10	11	11

SUM527
SUMSQR5581
MEAN10.54
SD.734291

FREQUENCY:

TEMPERATURE: 39°C

EXPERIMENT NUMBER:

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 1

GROUP#: 1633

CHROMOSOME #

17	21	17	18	18
19	18	18	18	20
18	22	23	19	18
19	22	22	17	23
18	19	19	16	19
24	19	15	17	18
19	17	19	21	20
22	18	19	21	20
23	16	19	19	20
22	18	18	19	18

SUM959

SUMSQR18593

MEAN19.18

SD2.01717

GROUP#: 1633

SCE/CELL

11	7	13	5	11
10	9	13	10	10
8	7	12	9	10
10	12	9	14	8
11	10	11	11	14
14	15	10	12	8
8	12	12	8	9
12	9	6	11	12
11	11	13	11	14
15	10	7	10	7

SUM522

SUMSQR5720

MEAN10.44

SD2.34877

SLIDE NUMBER: 2

GROUP#: 1724

CHROMOSOME #

20	21	19	21	19
19	19	19	17	20
17	22	21	18	20
20	18	20	22	20
18	19	16	20	22
19	21	21	21	19
20	17	20	20	20
19	18	19	21	20
20	19	19	17	20
20	21	20	22	20

SUM980

SUMSQR19304

MEAN19.6

SD1.39971

GROUP#: 1724

SCE/CELL

11	11	10	10	11
8	12	11	9	10
11	9	14	10	10
13	12	10	12	9
11	9	9	11	11
10	12	12	11	11
11	9	11	11	12
9	12	11	10	10
10	9	8	10	12
10	13	12	11	6

SUM527

SUMSQR5657

MEAN10.54

SD1.44575

FREQUENCY:

TEMPERATURE: 39°C

EXPERIMENT NUMBER:

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 2

GROUP#: 6234
CHROMOSOME #

18	22	20	19	19
19	19	19	20	21
20	19	18	19	20
21	19	21	20	18
21	17	19	18	19
19	21	20	21	22
19	19	19	21	21
20	17	20	21	21
20	18	19	18	21
18	19	20	20	22

SUM981

SUMSQR19325

MEAN19.62

SD1.2599

GROUP#: 6234

SCE/CELL

12	12	11	11	11
10	11	9	10	10
11	8	8	11	9
12	9	9	10	10
12	11	11	11	9
10	11	13	11	11
8	10	12	11	12
10	11	11	11	10
9	11	10	11	10
11	11	9	11	10

SUM523

SUMSQR5533

MEAN10.46

SD1.12866

SLIDE NUMBER: 2

GROUP#: 9063
CHROMOSOME #

20	18	20	19	18
20	19	16	17	20
19	21	21	20	16
20	18	22	20	23
19	22	20	17	17
19	21	19	20	21
18	16	18	19	18
20	19	20	20	22
17	20	20	22	19
21	19	21	23	20

SUM974

SUMSQR19118

MEAN19.48

SD1.71714

GROUP#: 9063

SCE/CELL

11	12	12	11	11
15	11	12	10	8
11	12	10	12	10
10	13	9	13	11
9	11	10	13	13
10	12	11	12	7
12	11	10	12	13
8	12	12	12	8
10	12	10	13	11
11	9	11	12	14

SUM555

SUMSQR6287

MEAN11.1

SD1.60675

FREQUENCY:
850 MHz

TEMPERATURE (deg C):
39

EXPERIMENT #:
4

GROUP	# CELLS SCORED	DICENTRICS/CELL
CONTROL	500	0
EXPOSED	500	0

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

PARAMETER: Growth Kinetics

EXPERIMENT NUMBER: 4

<u>Time (hr.)</u>	<u>Cells/Flask</u>		<u>Mean Cells/Flask (1 SD)</u>	
	<u>CONTROL</u>	<u>EXPOSED</u>	<u>CONTROL</u>	<u>EXPOSED</u>
3	26654	28234	26742 (63)	28259 (18)
	26778	28268		
	26795	28276		
28	132589	136507	132641 (47)	136546 (29)
	132632	136556		
	132703	136576		
46	419873	424415	419761 (80)	424415 (8)
	419716	424425		
	419694	424406		

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

PARAMETER: Cell Survival

EXPERIMENT NUMBER: 4

COLONIES/FLASK		SURVIVING FRACTION
Control	Exposed	
200	212	1.07
193	192	.97
<u>201</u>	190	<u>.96</u>
Mean 198		Mean (1 SD) 1.00 (0.050)

EXPERIMENT NUMBER 5

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 5

SLIDE NUMBER: 1

TEMPERATURE: 37°C

FLASK NUMBER:

CONTROL 1

GROUP#: 6878
CHROMOSOME #

20	21	18	19	19
19	19	20	20	20
20	19	20	18	20
20	21	19	19	20
20	19	19	20	20
21	20	21	18	20
20	20	18	22	19
20	20	18	21	18
19	20	19	19	17
19	18	20	21	19

SUM976

SUMSQR19102

MEAN19.52

SD1.01499

GROUP#: 6878

SCE/CELL

12	11	11	9	10
10	10	10	10	10
12	10	11	9	9
10	10	11	11	13
11	11	10	8	10
11	9	10	10	10
12	14	10	12	11
9	11	10	11	12
13	10	12	11	10
11	10	10	9	10

SUM527

SUMSQR5621

MEAN10.54

SD1.16426

SLIDE NUMBER: 2

GROUP#: 8453
CHROMOSOME #

19	20	20	20	18
20	19	20	19	18
19	19	18	20	18
19	22	20	21	18
19	20	20	19	20
21	19	18	20	19
20	20	18	20	18
19	20	20	20	21
18	20	19	20	20
20	19	20	18	20

SUM972

SUMSQR18940

MEAN19.44

SD.951047

GROUP#: 8453

SCE/CELL

10	8	12	11	11
12	10	11	9	10
11	11	11	11	9
9	11	10	10	11
10	11	10	11	10
10	12	10	9	11
10	9	10	11	11
12	10	11	11	9
11	11	12	10	10
11	10	11	11	11

SUM524

SUMSQR5532

MEAN10.48

SD.908913

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 5

SLIDE NUMBER: 1

TEMPERATURE: 37°C

FLASK NUMBER:

CONTROL 2

GROUP#: 7094
CHROMOSOME #

16	20	22	18	20
20	21	20	21	17
20	19	18	19	18
21	20	18	21	21
20	17	18	20	17
19	20	21	20	19
20	18	18	18	21
19	20	23	18	18
20	18	18	21	20
19	19	21	19	19

SUM968
SUMSQR18842
MEAN19.36
SD1.43939

GROUP#: 7094
SCE/CELL

8	10	13	11	10
12	12	12	9	10
10	13	11	11	12
9	10	10	9	12
11	9	12	11	11
12	11	11	10	9
10	9	9	11	12
10	9	10	9	9
11	7	10	12	11
12	12	10	10	12

SUM526
SUMSQR5620
MEAN10.52
SD1.32849

SLIDE NUMBER: 2

GROUP#: 1526
CHROMOSOME #

20	20	20	20	18
20	19	18	20	19
20	21	20	20	21
19	20	18	19	21
20	19	21	18	20
20	19	19	20	21
19	21	19	20	18
19	19	19	19	19
20	21	20	19	20
18	19	21	18	20

SUM978
SUMSQR19172
MEAN19.56
SD.92934

GROUP#: 1526
SCE/CELL

11	12	10	12	12
10	10	10	11	9
11	11	11	9	10
11	11	10	11	11
10	11	9	12	9
11	10	11	11	10
10	11	10	10	10
11	12	10	10	10
11	10	11	11	11
10	11	10	11	10

SUM527
SUMSQR5585
MEAN10.54
SD.787919

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 5

SLIDE NUMBER: 1

TEMPERATURE: 39°C

FLASK NUMBER:

EXPOSED 1

GROUP#: 479

CHROMOSOME #

20	19	20	19	19
20	20	21	19	18
20	19	20	18	19
20	19	20	19	20
18	19	20	19	18
20	19	20	19	19
20	19	20	19	20
20	20	19	20	18
20	20	19	18	21
19	21	20	20	19

SUM972

SUMSQR18926

MEAN19.44

SD.786623

GROUP#: 479

SCE/CELL

11	10	11	11	10
12	7	10	11	10
11	10	10	10	9
10	11	11	12	11
10	10	10	10	11
11	11	10	9	10
10	10	11	9	11
12	11	10	12	11
10	10	10	10	11
11	12	10	9	9

SUM519

SUMSQR5431

MEAN10.38

SD.945235

SLIDE NUMBER: 2

GROUP#: 833

CHROMOSOME #

19	22	21	21	18
21	19	19	21	18
17	17	20	22	20
19	19	20	22	19
21	16	19	20	16
19	19	17	17	19
17	21	21	21	17
21	19	19	21	22
18	20	19	19	20
21	16	18	20	19

SUM966

SUMSQR18800

MEAN19.32

SD1.67137

GROUP#: 833

SCE/CELL

11	10	13	10	9
8	9	9	9	14
11	14	9	12	10
8	9	10	9	8
10	9	9	9	12
11	10	15	10	10
9	11	13	10	9
11	10	11	12	13
13	9	11	9	11
10	11	7	10	11

SUM518

SUMSQR5510

MEAN10.36

SD1.71143

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

EXPERIMENT NUMBER: 5

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 2

GROUP#: 7746
CHROMOSOME #

22	21	19	21	21
20	20	20	20	19
19	21	20	21	20
20	20	21	20	19
23	22	19	19	22
19	18	20	21	17
19	19	20	20	19
20	21	20	17	19
19	19	18	19	21
21	21	20	20	18

SUM994
SUMSQR19836
MEAN19.88
SD1.23949
GROUP#: 7746

SCE/CELL

12	10	11	10	11
10	9	9	10	12
10	10	10	9	10
9	11	13	10	10
10	9	12	10	9
11	12	8	12	8
11	11	12	8	11
11	9	12	10	11
11	11	8	12	11
11	11	12	13	12

SUM525
SUMSQR5595
MEAN10.5
SD1.29756

SLIDE NUMBER: 2

GROUP#: 8468
CHROMOSOME #

18	20	20	20	20
21	18	20	20	20
21	20	21	19	19
20	20	21	21	20
21	19	20	21	20
20	19	21	18	20
19	19	20	18	20
21	19	20	20	20
18	20	18	19	20
21	20	19	20	18

SUM987
SUMSQR19527
MEAN19.74
SD.943506
GROUP#: 8468

SCE/CELL

10	9	11	11	12
10	12	10	10	9
10	11	12	12	10
11	12	11	10	12
10	10	11	12	10
9	10	10	11	10
12	10	10	9	11
10	8	12	10	10
10	10	11	10	9
10	11	10	10	12

SUM523
SUMSQR5519
MEAN10.46
SD.994064

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

PARAMETER: Cell Survival

EXPERIMENT NUMBER: 5

COLONIES/FLASK		SURVIVING FRACTION
Control	Exposed	
192	189	1.00
180	193	1.02
<u>195</u>	202	<u>1.07</u>
Mean 189		Mean (1 SD) 1.03 (0.029)

EXPERIMENT NUMBER 6

FREQUENCY: 850 MHz

EXPERIMENT NUMBER: 6

SLIDE NUMBER: 1

TEMPERATURE: 37°C

FLASK NUMBER:

CONTROL 1

GROUP#:1577
CHROMOSOME #

19	19	18	20	19
19	22	19	21	19
19	19	19	19	17
21	20	16	18	20
17	20	20	22	18
18	20	19	20	20
19	18	18	20	19
21	18	22	18	19
22	18	21	19	20
19	19	18	19	20

SUM964
SUMSQR18672
MEAN19.28
SD1.32542
GROUP#:1577
SCE/CELL

13	8	8	11	11
11	9	8	13	13
8	11	9	10	8
12	12	9	11	13
13	12	10	12	9
10	13	12	12	11
10	14	12	10	9
9	9	8	9	11
10	9	10	9	12
12	8	9	11	9

SUM522
SUMSQR5594
MEAN10.44
SD1.71619

SLIDE NUMBER: 2

GROUP#:7133
CHROMOSOME #

19	19	21	20	21
20	19	18	20	19
21	19	19	19	19
19	19	19	21	19
20	21	20	20	21
21	19	19	20	19
19	19	19	20	18
20	20	19	20	19
20	20	20	20	19
20	21	20	20	21

SUM984
SUMSQR19398
MEAN19.68
SD.819158
GROUP#:7133
SCE/CELL

11	11	12	10	10
10	11	10	10	10
10	10	11	10	10
9	12	10	11	10
11	11	10	12	11
10	10	11	10	10
12	12	11	10	11
11	10	12	10	10
11	9	10	11	11
10	11	10	10	11

SUM527
SUMSQR5583
MEAN10.54
SD.761577

FREQUENCY: 850 MHz

TEMPERATURE: 37°C

EXPERIMENT NUMBER: 6

FLASK NUMBER:

SLIDE NUMBER: 1

CONTROL 2

GROUP#: 5728
CHROMOSOME #

20	22	19	24	20
16	22	19	21	21
18	18	19	19	21
17	20	19	17	19
20	23	19	21	22
19	17	22	18	22
20	18	19	20	19
18	21	22	21	18
18	17	18	21	18
19	19	18	15	20

SUM973
SUMSQR19105
MEAN19.46
SD1.86493
GROUP#: 5728
SCE/CELL

10	17	11	8	9
10	7	10	13	9
12	11	10	8	8
15	7	12	10	8
13	11	12	8	10
14	11	10	11	11
10	8	13	11	10
11	7	10	13	10
9	11	11	10	7
9	13	12	12	10

SUM523
SUMSQR5689
MEAN10.46
SD2.11129

SLIDE NUMBER: 2

GROUP#: 3553
CHROMOSOME #

19	19	19	20	18
20	19	19	20	18
19	21	19	20	20
19	20	20	20	19
19	20	20	20	19
19	21	19	20	19
20	20	20	20	20
21	20	19	20	20
20	19	20	21	19
19	20	20	20	19

SUM981
SUMSQR19271
MEAN19.62
SD.696639
GROUP#: 3553
SCE/CELL

10	11	10	10	10
10	11	11	11	10
11	11	10	10	12
11	12	11	11	11
11	11	11	10	11
10	11	10	10	11
10	11	10	11	10
11	11	10	10	10
11	11	11	10	11
10	10	11	10	11

SUM530
SUMSQR5634
MEAN10.6
SD.571429

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

EXPERIMENT NUMBER: 6

FLASK NUMBER:

SLIDE NUMBER: 1

EXPOSED 2

GROUP#: 6037
CHROMOSOME #

20	20	20	19	22
20	18	19	19	16
22	18	20	20	20
19	18	19	19	18
19	20	17	22	18
20	21	18	18	20
20	17	18	18	18
18	19	20	21	20
20	18	17	20	19
20	17	18	22	20

SUM959

SUMSQ18491

MEAN19.18

SD1.40973

GROUP#: 6037

SCE/CELL

11	11	11	9	11
9	7	12	11	12
12	9	12	11	10
11	12	10	9	9
11	11	8	9	10
12	10	8	9	7
10	11	8	9	11
12	11	12	10	7
10	9	12	11	11
11	12	11	10	10

SUM512

SUMSQ5344

MEAN10.24

SD1.43655

SLIDE NUMBER: 2

GROUP#: 9944
CHROMOSOME #

20	20	21	19	20
19	20	21	21	18
19	20	21	21	19
20	21	18	20	19
21	19	19	19	21
20	21	19	20	20
20	21	19	19	18
20	20	19	18	19
19	18	21	19	19
19	19	18	18	19

SUM978

SUMSQ19178

MEAN19.56

SD.993037

GROUP#: 9944

SCE/CELL

10	10	10	11	11
13	10	9	11	9
11	12	10	9	13
11	10	12	11	11
10	10	9	12	11
11	12	11	10	10
10	11	11	12	12
11	11	10	11	10
12	10	10	11	10
11	10	12	11	11

SUM537

SUMSQ5813

MEAN10.74

SD.964894

FREQUENCY:
850 MHz

TEMPERATURE (deg C):
39

EXPERIMENT #:
6

GROUP	# CELLS SCORED	DICENTRICS/CELL
CONTROL	500	0
EXPOSED	500	0

FREQUENCY: 850 MHz

TEMPERATURE: 39°C

PARAMETER: Cell Survival

EXPERIMENT NUMBER: 6

COLONIES/FLASK		SURVIVING FRACTION
Control	Exposed	
177	157	0.89
180	181	1.03
<u>171</u>	179	<u>1.02</u>
Mean 176		Mean (1 SD) 0.98 (0.64)

END

FILMED

2-85

DTIC

